IN THE CLAIMS:

1. A pre-curing apparatus for pre-curing a curable liquid applied to a surface of a substrate comprising:

a conveyance system; and

a plurality of substrate holding members, each of said plurality of substrate holding members being adjoined to the conveyance system and conveyed in a predetermined direction, wherein each of said plurality of substrate holding members being configured for holding the surface of the substrate in a preset orientation, the preset orientation askew to the predetermined direction.

2. The pre-curing apparatus recited in Claim 1, wherein the preset orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

3. The pre-curing apparatus recited in Claim 1, wherein the preset orientation is between ninety-one degrees (91°) and one-hundred thirty degrees (130°) to the predetermined direction.

4. The pre-curing apparatus recited in Claim 1, wherein the preset orientation is between one-hundred thirty degrees (130°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

5. The pre-curing apparatus recited in Claim 1, wherein a first substrate holding member is adjoined to the conveyance system at a predetermined distance from a second substrate holding member, the predetermined distance being based on one of pre-curing time, conveyance speed, substrate thickness and the preset orientation.

6. The pre-curing apparatus recited in Claim 1, wherein a magnitude of the preset orientation is based on flowing the curable liquid across the surface of the substrate.

7. The pre-curing apparatus recited in Claim 1, wherein a magnitude of the preset orientation is based on one of increasing substrate throughput, decreasing conveyance system size and decreasing conveyance speed.

8. The pre-curing apparatus recited in Claim 1, wherein a magnitude of the preset orientation is based on one of increasing substrate throughput, decreasing conveyance system size and decreasing conveyance speed.

9. The pre-curing apparatus recited in Claim 1 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

10. The pre-curing apparatus recited in Claim 1 above, wherein the substrate is a graphic media including at least one graphics image.

11. The pre-curing apparatus recited in Claim 10 above, wherein the substrate is a graphic media is a printable media and the laminate layer is applied to one of the printable media, graphics image, and printable media and graphics image.

12. The pre-curing apparatus recited in Claim 1 above, further comprises:

an enclosure cave, wherein the enclosure cave at least partially encloses a substrate holding member being conveyed in the predetermined direction.

13. The pre-curing apparatus recited in Claim 1 above, wherein the substrate is preprocessed with an ink-receptive coating.

14. The pre-curing apparatus recited in Claim 13 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

15. The pre-curing apparatus recited in Claim 1 above, wherein the plurality of substrate holding members are configured in a preset orientation, the preset orientation askew to the predetermined direction.

16. The pre-curing apparatus recited in Claim 1 above, wherein the substrate holding members being conveyed in the predetermined direction for a predetermined distance.

17. The pre-curing apparatus recited in Claim 16 above, wherein the predetermined distance is based on an amount of time for the curable liquid to pre-cure on the surface of the substrate.

18. The pre-curing apparatus recited in Claim 17 above, wherein the amount of time is based on, one of thickness of the curable liquid and the preset orientation of the surface of the substrate.

19. The pre-curing apparatus recited in Claim 1 further comprises:
a drip pan for containing residual curable liquid from the surface of the substrate.

20. The pre-curing apparatus recited in Claim 1, wherein the conveyance system is configured with a conveyance portion for conveying a substrate holding members in the predetermined direction.

21. The pre-curing apparatus recited in Claim 20, wherein the predetermined direction is substantially linear.

22. The pre-curing apparatus recited in Claim 20, wherein the conveyance portion is substantially linear.

23. The pre-curing apparatus recited in Claim 20, wherein the conveyance system is substantially horizontal and the conveyance portion is substantially linear.

24. The pre-curing apparatus recited in Claim 20, wherein the predetermined orientation is near vertical.

25. The pre-curing apparatus recited in Claim 20, wherein the conveyance system is substantially vertical and the conveyance portion is substantially linear.

26. The pre-curing apparatus recited in Claim 20, wherein the predetermined orientation is perpendicular to near vertical.

27. The pre-curing apparatus recited in Claim 1, wherein the substrate is positioned on the forward facing side of the a substrate holding member.

28. The pre-curing apparatus recited in Claim 20, wherein the conveyance system is substantially horizontal and the conveyance portion is substantially horizontal.

29. The pre-curing apparatus recited in Claim 20, wherein the conveyance system is substantially vertical and the conveyance portion is substantially vertical.

30. The pre-curing apparatus recited in Claim 28, wherein the substrate is loaded onto a substrate holding member while the substrate is in a substantially horizontal orientation prior to the substrate holding member being conveyed to the substantially horizontal conveyance portion.

31. An apparatus for pre-curing and post-curing a curable liquid applied to a surface of a substrate comprising:

a conveyance system configured with a first conveyance portion for conveying in a first predetermined direction and further configured with a second conveyance portion for simultaneously conveying in a second predetermined direction; and

a plurality of substrate holding members, each of said substrate holding members being configured for holding a substrate in a preset orientation, the preset orientation askew to one of the first and second predetermined directions, wherein one of the plurality substrate holding members holds a first substrate being conveyed on the first conveyance portion in the first direction during which the curable liquid applied to the surface of the first substrate is pre-cured and further wherein another of the plurality substrate holding members holds a second substrate being conveyed on the second conveyance portion in the second direction during which the curable liquid applied to the surface of the second substrate is post-cured.

32. The apparatus recited in Claim 31, wherein the preset orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the first predetermined direction.

33. The apparatus recited in Claim 31, wherein the preset orientation is between ninety-one degrees (91°) and one-hundred thirty degrees (130°) to the first predetermined direction.

34. The apparatus recited in Claim 31, wherein the preset orientation is between one-hundred thirty degrees (130°) and one-hundred seventy-nine degrees (179°) to the first predetermined direction.

35. The apparatus recited in Claim 31, wherein the first substrate holding member is adjoined to the conveyance system at a predetermined interval from a third substrate holding member, the predetermined interval being based on one of pre-curing time, conveyance speed, substrate thickness and the preset orientation.

36. The apparatus recited in Claim 31, wherein a magnitude of the first preset orientation is based on flowing the curable liquid across the surface of the first substrate.

37. The apparatus recited in Claim 31, wherein a magnitude of the first preset orientation is based on one of substrate throughput, conveyance system length and conveyance speed.

38. The apparatus recited in Claim 31 further comprises:

a downloader for downloading a substrate with a post-cured liquid applied to the surface of the substrate is post-cured.

39. The apparatus recited in Claim 31 above, wherein the first substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

40. The apparatus recited in Claim 31 above, wherein the first substrate is a graphic media including at least one graphics image.

41. The apparatus recited in Claim 40 above, wherein the first substrate is a graphic media is a printable media and the laminate layer is applied to one of the printable media, graphics image, and printable media and graphics image.

42. The apparatus recited in Claim 31 above further comprises:

an enclosure cave, wherein the enclosure cave at least partially encloses the first substrate holding member being conveyed in the first predetermined direction.

43. The apparatus recited in Claim 31 above, wherein the first substrate is preprocessed with an ink-receptive coating.

44. The apparatus recited in Claim 43 above, wherein the first substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

45. The apparatus recited in Claim 31 above, wherein a third substrate holding member is configured in a third preset orientation, the third preset orientation askew to the first predetermined direction.

46. The apparatus recited in Claim 31 above, wherein the first conveyance portion continues in the first predetermined direction for a first predetermined distance.

47. The apparatus recited in Claim 46 above, wherein the first predetermined distance is based on an amount of time for the curable liquid to pre-cure.

48. The apparatus recited in Claim 47 above, wherein the amount of time is based on one of thickness of the curable liquid and the preset orientation of the surface of the first substrate.

49. The apparatus recited in Claim 31 further comprises:
a drip pan for containing residual curable liquid from the surface of the first substrate.

50. The apparatus recited in Claim 31, wherein the conveyance system is configured with a first conveyance portion for conveying a plurality of substrate holding members in the first predetermined direction.

51. The apparatus recited in Claim 50, wherein the first predetermined direction is substantially linear.

52. The apparatus recited in Claim 50, wherein the first conveyance portion is substantially linear.

53. The apparatus recited in Claim 50, wherein the conveyance system is substantially horizontal and the first conveyance portion is substantially linear.

54. The apparatus recited in Claim 50, wherein the predetermined orientation is near vertical.

55. The apparatus recited in Claim 50, wherein the conveyance system is substantially vertical and the first conveyance portion is substantially linear.

56. The apparatus recited in Claim 50, wherein the predetermined orientation is perpendicular to near vertical.

57. The apparatus recited in Claim 31, wherein the first substrate is positioned on the forward facing side of the first substrate holding member.

58. The apparatus recited in Claim 50, wherein the conveyance system is substantially horizontal and the first conveyance portion is substantially horizontal.

59. The apparatus recited in Claim 50, wherein the conveyance system is substantially vertical and the first conveyance portion is substantially vertical.

60. The apparatus recited in Claim 58, wherein the substrate is loaded onto a substrate holding member while the substrate is in a substantially horizontal orientation prior to the substrate holding member being conveyed to the substantially horizontal first conveyance portion.

61. The apparatus recited in Claim 31, wherein the preset orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the second predetermined direction.

62. The apparatus recited in Claim 31, wherein the preset orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the first predetermined direction and to the second predetermined direction.

63. The apparatus recited in Claim 31, wherein the preset orientation is between ninety-one degrees (91°) and one-hundred thirty degrees (130°) to the second predetermined direction.

64. The apparatus recited in Claim 31, wherein the preset orientation is between one-hundred thirty degrees (130°) and one-hundred seventy-nine degrees (179°) to the second predetermined direction.

65. The apparatus recited in Claim 31, wherein the second substrate holding member is adjoined to the conveyance system at a predetermined interval from a third substrate holding member, the predetermined interval being based on one of post-curing time, conveyance speed, substrate thickness and temperature.

66. The apparatus recited in Claim 31, wherein a magnitude of the second preset orientation is based holding the second substrate in the second substrate holding member.

67. The apparatus recited in Claim 31, wherein a magnitude of the second preset orientation is based on one of substrate throughput, conveyance system length and conveyance speed.

68. The apparatus recited in Claim 31 above further comprises:

an enclosure cave, wherein the enclosure cave at least partially encloses the second substrate holding member being conveyed in the second predetermined direction.

69. The apparatus recited in Claim 31 above, wherein the second substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

70. The apparatus recited in Claim 31 above, wherein the second substrate is a graphic media including at least one graphics image.

71. The apparatus recited in Claim 70 above, wherein the second substrate is a graphic media is a printable media and the laminate layer is applied to one of the printable media, graphics image, and printable media and graphics image.

72. The apparatus recited in Claim 68 further comprises:

an air circulator for circulating air throughout the enclosure cave.

73. The apparatus recited in Claim 31 above, wherein the second substrate is preprocessed with an ink-receptive coating.

74. The apparatus recited in Claim 73 above, wherein the second substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

75. The apparatus recited in Claim 31 above, wherein a third substrate holding member is configured in a third preset orientation, the third preset orientation askew to the second predetermined direction.

76. The apparatus recited in Claim 31 above, wherein the second conveyance portion continues in the second predetermined direction for a second predetermined distance.

77. The apparatus recited in Claim 76 above, wherein the second predetermined distance is based on an amount of time for the curable liquid to pre-cure.

78. The apparatus recited in Claim 77 above, wherein the amount of time is based on the temperature of the second substrate.

79. The apparatus recited in Claim 31 further comprises:
a downloader for downloading a post-cured substrate.

80. The apparatus recited in Claim 31, wherein the second conveyance portion is substantially linear.

81. The apparatus recited in Claim 80, wherein the conveyance system is substantially horizontal and the second conveyance portion is substantially linear.

82. The apparatus recited in Claim 80, wherein the second predetermined orientation is near vertical.

83. The apparatus recited in Claim 80, wherein the conveyance system is substantially vertical and the second conveyance portion is substantially linear.

84. The apparatus recited in Claim 80, wherein the predetermined orientation is perpendicular to near vertical.

85. The apparatus recited in Claim 31, wherein the second substrate is positioned on the forward facing side of the second substrate holding member.

86. The apparatus recited in Claim 80, wherein the conveyance system is substantially horizontal and the second conveyance portion is substantially horizontal.

87. The apparatus recited in Claim 80, wherein the conveyance system is substantially vertical and the second conveyance portion is substantially vertical.

88. The dynamic curing apparatus recited in Claim 31 above, wherein one substrate holding member is substantially parallel with a preceding substrate holding member while the pair of substrate holding members are being conveyed on the first conveyance portion in the first direction.

89. The dynamic curing apparatus recited in Claim 31 above, wherein one substrate holding member is substantially parallel with a preceding substrate holding member while the pair of substrate holding members are being conveyed on the second conveyance portion in the second direction.

90. The dynamic curing apparatus recited in Claim 31 above, wherein the first direction is substantially opposite to the second direction.

91. The apparatus recited in Claim 31 further comprising:

a curing source for emitting energy rays, wherein the energy rays are simultaneously directed toward the curable liquid on a first surface of a third substrate held in a third substrate holding member and toward a second surface of a forth substrate held in a forth substrate holding member, wherein the conveyance system is configured with a third conveyance portion, the third conveyance portion being a curvilinear conveyance portion, wherein a third substrate holding member holds the third substrate being conveyed on the third conveyance portion in a third direction during which the curable liquid applied to a surface of the third substrate is cured.

92. The dynamic curing apparatus recited in Claim 91 above, wherein the energy rays are simultaneously directed toward the curable liquid on a first surface of a third substrate held in the third substrate holding member and toward a second surface located on an opposite side of the third substrate.

93. The dynamic curing apparatus recited in Claim 91 above, wherein the curing source emits energy in the form of one of ultraviolet (UV), infrared (IR), electron (E-) beam and microwave.

94. The dynamic curing apparatus recited in Claim 91 above, wherein the curing source for emitting energy rays is configurable for directing energy rays in a second direction.

95. The dynamic curing apparatus recited in Claim 91 above, wherein the energy rays are directed toward one of the third and forth substrate holding members, thereby curing residue of the curable liquid contaminating the one of the third and forth substrate holding members.

96. The dynamic curing apparatus recited in Claim 91 above, wherein the third substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

97. The dynamic curing apparatus recited in Claim 91 above, wherein the third substrate is a graphic media including at least one graphics image.

98. The dynamic curing apparatus recited in Claim 97 above, wherein the third substrate is a graphic media is a printable media and the laminate layer is applied to one of the printable media, graphics image, and printable media and graphics image.

99. The dynamic curing apparatus recited in Claim 98 above, wherein the energy curable liquid laminate is curable by exposure to ultraviolet energy.

100. The dynamic curing apparatus recited in Claim 99 above, wherein the third substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

101. The dynamic curing apparatus recited in Claim 91 above, wherein the curable liquid is applied to a surface of a substrate at a depth in excess of twenty thousandths of an inch (20.0 mils.).

102. The dynamic curing apparatus recited in Claim 91 above, wherein the curable liquid is applied to a surface of a substrate at a depth in excess of twenty-five thousandths of an inch (25.0 mils.).

103. The dynamic curing apparatus recited in Claim 91 above, wherein the curable liquid is applied to a surface of a substrate at a depth in excess of thirty thousandths of an inch (30.0 mils.).

104. The dynamic curing apparatus recited in Claim 91 above, wherein the curable liquid is applied to a surface of a substrate at a depth in excess of thirty-five thousandths of an inch (35.0 mils.).

105. The dynamic curing apparatus recited in Claim 91 above, wherein the third substrate is preprocessed with an ink-receptive coating.

106. The dynamic curing apparatus recited in Claim 105 above, wherein the third substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

107. The dynamic curing apparatus recited in Claim 91 above, wherein a substrate holding member maintains the preset orientation relative to the curvilinear direction as the substrate holding member is conveyed across the curvilinear conveyance portion.

108. The dynamic curing apparatus recited in Claim 91 above, wherein a substrate is transferred from one substrate holding member to a preceding substrate holding member as the substrate holding member and preceding substrate holding member are conveyed across the curvilinear conveyance portion.

109. The dynamic curing apparatus recited in Claim 91 above, wherein a substrate is transferred from a forward facing side of one substrate holding member to a rear facing side of a preceding substrate holding member as the substrate is conveyed across the curvilinear conveyance portion.

110. The dynamic curing apparatus recited in Claim 91 above, wherein the conveyance system is configured in a loop with the first conveyance portion above the second conveyance portion and the third conveyance portion being the curvilinear conveyance portion connecting to the first conveyance portion and the second conveyance portion.

111. The dynamic curing apparatus recited in Claim 91 above, wherein one substrate holding member is substantially parallel with a preceding substrate holding member prior to either of the pair of substrate holding members being conveyed across the curvilinear conveyance portion.

112. The dynamic curing apparatus recited in Claim 111 above, wherein one substrate holding member is askew from a preceding substrate holding member by a predetermined angle as the pair of substrate holding members are conveyed across the curvilinear conveyance portion.

113. The dynamic curing apparatus recited in Claim 111 above, wherein an amount of exposure to the energy rays emitted from the curing source by the curable liquid on a first surface is based on a value of the predetermined angle.

114. The dynamic curing apparatus recited in Claim 91 above, wherein the curing source further comprises:

an ultraviolet (UV) lamp having an arch length greater than a width of the third substrate.

115. The dynamic curing apparatus recited in Claim 91 above, wherein the curing source further comprises:

a plurality of ultraviolet (UV) lamps, wherein first energy rays emitted from a first lamp are directed askew from second energy rays emitted from a second lamp.

116. The dynamic curing apparatus recited in Claim 115 above, wherein the first energy rays emitted from the first lamp are directed toward the curable liquid on a front surface of the third substrate and second energy rays emitted from the second lamp are directed toward the rear surface of the forth substrate.

117. The dynamic curing apparatus recited in Claim 91 above, wherein the curing source is a lamp module comprising:

an ultraviolet (UV) lamp having an arch length greater than a width of the substrate;

a reflector; and

a cooling mechanism.

118. The dynamic curing apparatus recited in Claim 117 above, wherein the cooling mechanism transfers heat from the lamp module by a heat transfer medium, the heat transfer medium being one of air and water.

119. The dynamic curing apparatus recited in Claim 91 above, wherein the curvilinear conveyance portion of the conveyance system being substantially configured as an arc.

120. The dynamic curing apparatus recited in Claim 91 above further comprises:

an enclosure hood, wherein the enclosure hood at least partially encloses a substrate holding member being conveyed in the curvilinear direction.

121. A dynamic curing apparatus for dynamically curing a curable liquid applied to a surface of a substrate comprising:

a conveyance system being configured with curvilinear conveyance portion;

a plurality of substrate holding members, each of said substrate holding members being adjoined to the conveyance system and conveyed across the curvilinear conveyance portion thereon in a curvilinear direction, wherein each of said substrate holding members is configured at a preset orientation relative to the curvilinear direction; and

a curing source for emitting energy rays, wherein the energy rays are simultaneously directed toward the curable liquid on a first surface of a first substrate held in a first substrate holding member and toward a second surface of a second substrate held in a second substrate holding member.

122. The dynamic curing apparatus recited in Claim 121 above, wherein the energy rays are simultaneously directed toward the curable liquid on the first surface of a first substrate held in the first substrate holding member and toward a second surface located on an opposite side of the first substrate.

123. The dynamic curing apparatus recited in Claim 121 above, wherein the curing source emits energy in the form of one of ultraviolet (UV), infrared (IR), electron (E-) beam and microwave.

124. The dynamic curing apparatus recited in Claim 121 above, wherein the curing source for emitting energy rays is configurable for directing energy rays in a second direction.

125. The dynamic curing apparatus recited in Claim 121 above, wherein the energy rays are directed toward one of the first and second substrate holding member, thereby curing residue of the curable liquid contaminating the one of the first and second substrate holding member.

126. The dynamic curing apparatus recited in Claim 121 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

127. The dynamic curing apparatus recited in Claim 121 above, wherein the substrate is a graphic media including at least one graphics image.

128. The dynamic curing apparatus recited in Claim 127 above, wherein the substrate is a graphic media is a printable media and the laminate layer is applied to one of the printable media, graphics image, and printable media and graphics image.

129. The dynamic curing apparatus recited in Claim 128 above, wherein the energy curable liquid laminate is curable by exposure to ultraviolet energy.

130. The dynamic curing apparatus recited in Claim 129 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

131. The dynamic curing apparatus recited in Claim 121 above, wherein the curable liquid applied to a surface of a substrate at a depth in excess of twenty thousandths of an inch (20.0 mils.).

132. The dynamic curing apparatus recited in Claim 121 above, wherein the curable liquid applied to a surface of a substrate at a depth in excess of twenty-five thousandths of an inch (25.0 mils.).

133. The dynamic curing apparatus recited in Claim 121 above, wherein the curable liquid applied to a surface of a substrate at a depth in excess of thirty thousandths of an inch (30.0 mils.).

134. The dynamic curing apparatus recited in Claim 121 above, wherein the curable liquid applied to a surface of a substrate at a depth in excess of thirty-five thousandths of an inch (35.0 mils.).

135. The dynamic curing apparatus recited in Claim 121 above, wherein the substrate is preprocessed with an ink-receptive coating.

136. The dynamic curing apparatus recited in Claim 135 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

137. The dynamic curing apparatus recited in Claim 121 above, wherein a substrate holding member maintains the preset orientation relative to the curvilinear direction as the substrate holding member is conveyed across the curvilinear conveyance portion.

138. The dynamic curing apparatus recited in Claim 121 above, wherein a substrate is transferred from one substrate holding member to a preceding substrate holding member as the substrate holding member and preceding substrate holding member are conveyed across the curvilinear conveyance portion.

139. The dynamic curing apparatus recited in Claim 121 above, wherein a substrate is transferred from a forward facing side of one substrate holding member to a rear facing side of a preceding substrate holding member as the substrate is conveyed across the curvilinear conveyance portion.

140. The dynamic curing apparatus recited in Claim 121 above, wherein a substrate falls from a forward facing side of one substrate holding member to a rear facing side of a preceding substrate holding member as the substrate is conveyed across the curvilinear conveyance portion.

141. The dynamic curing apparatus recited in Claim 121 above, wherein one substrate holding member is substantially parallel with a preceding substrate holding member prior to either of the pair of substrate holding members being conveyed across the curvilinear conveyance portion.

142. The dynamic curing apparatus recited in Claim 141 above, wherein one substrate holding member is askew from a preceding substrate holding member by a predetermined angle as the pair of substrate holding members are conveyed across the curvilinear conveyance portion.

143. The dynamic curing apparatus recited in Claim 141 above, wherein an amount of exposure to the energy rays emitted from the curing source by the curable liquid on a first surface is based on a value of the predetermined angle.

144. The dynamic curing apparatus recited in Claim 121 above, wherein the curing source further comprises:

an ultraviolet (UV) lamp having an arch length greater than a width of the substrate.

145. The dynamic curing apparatus recited in Claim 121 above, wherein the curing source further comprises:

a plurality of ultraviolet (UV) lamps, wherein first energy rays emitted from a first lamp are directed askew from second energy rays emitted from a second lamp.

146. The dynamic curing apparatus recited in Claim 145 above, wherein the first energy rays emitted from the first lamp are directed toward the curable liquid on a front surface of the first substrate and second energy rays emitted from the second lamp are directed toward the rear surface of the second substrate.

147. The dynamic curing apparatus recited in Claim 121 above, wherein the curing source is a lamp module comprising:

an ultraviolet (UV) lamp having an arch length greater than a width of the substrate;

a reflector; and

a cooling mechanism.

148. The dynamic curing apparatus recited in Claim 147 above, wherein the cooling mechanism transfers heat from the lamp module by a heat transfer medium, the heat transfer medium being one of air and water.

149. The dynamic curing apparatus recited in Claim 121 above, wherein the curvilinear conveyance portion of the conveyance system being substantially configured as an arc.

150. The dynamic curing apparatus recited in Claim 121 above further comprises:

an enclosure hood, wherein the enclosure hood at least partially encloses a substrate holding member being conveyed in the curvilinear direction.

151. A method for pre-curing a curable liquid applied to a surface of a substrate, the method employing a pre-curing apparatus having a conveyance system and a plurality of substrate holding members, each of said plurality of substrate holding members being adjoined to the conveyance system and conveyed, the method comprising:

applying a curable liquid to a surface of a substrate;

receiving the substrate on a substrate holding member, wherein the substrate holding member is one of the plurality substrate holding members;

reorienting the substrate holding member to a predetermined orientation;

conveying the plurality substrate holding members on the conveyance system in a predetermined direction; and

pre-curing the curable liquid.

152. The method for pre-curing a curable liquid recited in Claim 151 further comprises:

wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

153. The method for pre-curing a curable liquid recited in Claim 151, wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred thirty degrees (130°) to the predetermined direction.

154. The method for pre-curing a curable liquid recited in Claim 151, wherein the predetermined orientation is between one-hundred thirty degrees (130°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

155. The method for pre-curing a curable liquid recited in Claim 151, wherein the substrate is a first substrate and the substrate holding member is a first substrate holding member, the method further comprises:

applying a curable liquid to a surface of a second substrate;

receiving the second substrate on a second substrate holding member, wherein the second substrate holding member is another of the plurality substrate holding members and the second substrate holding member is adjoined to the conveyance system at a predetermined distance from the first substrate holding member, the predetermined distance being based on one of pre-curing time, conveyance speed, substrate thickness and the predetermined orientation;

reorienting the second substrate holding member to the predetermined orientation; and

pre-curing the curable liquid applied to the surface of the second substrate holding member.

156. The method for pre-curing a curable liquid recited in Claim 151, wherein a magnitude of the preset orientation is based on flowing the curable liquid across the surface of the substrate.

157. The method for pre-curing a curable liquid recited in Claim 151, wherein applying a curable liquid to a surface of a substrate further comprises:

screening the curable liquid laminate is applied to the surface of the substrate.

158. The method for pre-curing a curable liquid recited in Claim 151, wherein applying a curable liquid to a surface of a substrate further comprises:

jetting the curable liquid laminate is applied to the surface of the substrate.

159. The method for pre-curing a curable liquid recited in Claim 151, wherein applying a curable liquid to a surface of a substrate further comprises:

measuring the curable liquid laminate is applied to the surface of the substrate to a depth in excess of twenty thousandths of an inch (20.0 mils.).

160. The method for pre-curing a curable liquid recited in Claim 151, wherein applying a curable liquid to a surface of a substrate further comprises:

measuring the curable liquid laminate is applied to the surface of the substrate to a depth in excess of twenty-five thousandths of an inch (25.0 mils.).

161. The method for pre-curing a curable liquid recited in Claim 151, wherein applying a curable liquid to a surface of a substrate further comprises:

measuring the curable liquid laminate is applied to the surface of the substrate to a depth in excess of thirty thousandths of an inch (30.0 mils.).

162. The method for pre-curing a curable liquid recited in Claim 151, wherein applying a curable liquid to a surface of a substrate further comprises:

measuring the curable liquid laminate is applied to the surface of the substrate to a depth in excess of thirty-five thousandths of an inch (35.0 mils.).

163. The method for pre-curing a curable liquid recited in Claim 151, wherein applying a curable liquid to a surface of a substrate further comprises:

measuring the curable liquid laminate is applied to the surface of the substrate to a depth in excess of thirty-five thousandths of an inch (35.0 mils.).

164. The method for pre-curing a curable liquid recited in Claim 151, wherein prior to applying a curable liquid to a surface of a substrate the method further comprises:

combining silicon with the curable liquid.

165. The method for pre-curing a curable liquid recited in Claim 151 above, further comprises:

at least partially shielding a substrate holding member being conveyed in the predetermined direction from airborne particulate matter and latent ultraviolet radiation.

166. The method for pre-curing a curable liquid recited in Claim 151 above, wherein conveying the plurality substrate holding members on the conveyance system in a predetermined direction further comprises:

conveying the plurality substrate holding members in the predetermined direction for a predetermined distance.

167. The method for pre-curing a curable liquid recited in Claim 166 above, wherein the predetermined distance is based on an amount of time for the curable liquid to pre-cure on the surface of the substrate.

168. The method for pre-curing a curable liquid recited in Claim 167 above, wherein the amount of time is based on one of thickness of the curable liquid and the predetermined orientation of the surface of the substrate.

169. The method for pre-curing a curable liquid recited in Claim 151 further comprises:
containing residual curable liquid flowing from the surface of the substrate.

170. The method for pre-curing a curable liquid recited in Claim 151, wherein the predetermined direction is substantially linear.

171. The method for pre-curing a curable liquid recited in Claim 151, wherein the conveyance system is substantially horizontal, conveying the plurality substrate holding members on the conveyance system in a predetermined direction further comprises:
conveying the plurality substrate holding members in a substantially horizontal direction.

172. The method for pre-curing a curable liquid recited in Claim 171, wherein the predetermined orientation is near vertical.

173. The method for pre-curing a curable liquid recited in Claim 151, wherein the conveyance system is substantially vertical, conveying the plurality substrate holding members on the conveyance system in a predetermined direction further comprises:
conveying the plurality substrate holding members in a substantially vertical direction.

174. The method for pre-curing a curable liquid recited in Claim 173, wherein the predetermined orientation is near horizontal.

175. The method for pre-curing a curable liquid recited in Claim 151 further comprises:

curing the substrate;

applying a curable liquid to another surface of the substrate;

receiving the substrate on a substrate holding member, wherein the substrate holding member is one of the plurality substrate holding members;

reorienting the substrate holding member to a predetermined orientation;

conveying the plurality substrate holding members on the conveyance system in a predetermined direction; and

pre-curing the curable liquid on the other surface of the substrate.

176. The method for pre-curing a curable liquid recited in Claim 175 further comprises:

wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

177. The method for pre-curing a curable liquid recited in Claim 175, wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred thirty degrees (130°) to the predetermined direction.

178. The method for pre-curing a curable liquid recited in Claim 175, wherein the predetermined orientation is between one-hundred thirty degrees (130°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

179. The method for pre-curing a curable liquid recited in Claim 175, wherein applying a curable liquid to a surface of a substrate further comprises:

screening the curable liquid laminate is applied to the surface of the substrate.

180. The method for pre-curing a curable liquid recited in Claim 175, wherein applying a curable liquid to a surface of a substrate further comprises:

jetting the curable liquid laminate is applied to the surface of the substrate.

181. The method for pre-curing a curable liquid recited in Claim 175, wherein applying a curable liquid to a surface of a substrate further comprises:

measuring the curable liquid laminate is applied to the surface of the substrate to a depth of less than twelve thousandths of an inch (12.0 mils.).

182. A method for laminating a substrate with a curable liquid laminate applied to a surface of a substrate employing a wicket conveyor system, the wicket conveyor system being configured with a first conveyor portion for conveying in a first predetermined direction and configured with a second conveyor portion for conveying in a second predetermined direction and further with a third conveyor portion for conveying in a curvilinear direction between the first conveyor portion and the second conveyor portion and the wicket conveyor system further being configured with a plurality of wickets being adjoined to one of the first, second and third wicket conveyor portions, the method comprising:

applying a curable liquid laminate to a surface of a substrate;

receiving the substrate on to a wicket;

conveying the wicket on the first conveyor portion and in the first predetermined direction, wherein the curable liquid laminate is pre-cured along first predetermined direction.

183. The method for laminating a substrate using a wicket conveyor system recited in Claim 182 above further comprises:

conveying the wicket on the third conveyor portion and in the curvilinear direction, wherein the curable liquid laminate is cured along curvilinear direction.

184. The method for laminating a substrate using a wicket conveyor system recited in Claim 183 above further comprises:

conveying the wicket on the second conveyor portion and in the second predetermined direction, wherein the curable liquid laminate is post-cured along second predetermined direction.

185. An automated method for created high gloss laminated substrate surface comprising:

metering a coating of an energy curable liquid laminate to a surface of a substrate, the coating being metered to a depth of greater than twelve thousandths of an inch (12.0 mils.);

transferring the coated substrate to one of a plurality of substrate holding members, each of the plurality of substrate holding members being adjoined to a conveyance system, wherein the one of a plurality of substrate holding members is conveyed in a predetermined direction; and

conveying the substrate having the energy curable liquid laminated surface on the conveyance system in a predetermined direction, wherein the one of a plurality of substrate holding members substrate holding member is configured for holding the liquid laminated substrate in a preset orientation, the preset orientation askew to the second predetermined direction.

186. The method for pre-curing a curable liquid recited in Claim 185 further comprises:

wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

187. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred thirty degrees (130°) to the predetermined direction.

188. The method for pre-curing a curable liquid recited in Claim 185, wherein the predetermined orientation is between one-hundred thirty degrees (130°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

189. The automated method for created high gloss laminated substrate surface recited in Claim 185 further comprises:

curing the energy curable liquid laminate on the surface of the substrate.

190. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein a magnitude of the preset orientation is based on flowing the energy curable liquid laminate across the surface of the substrate.

191. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein metering a coating of an energy curable liquid laminate to a surface of a substrate further comprises:

screening the energy curable liquid laminate is applied to the surface of the substrate.

192. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein metering a coating of an energy curable liquid laminate to a surface of a substrate further comprises:

jetting the energy curable liquid laminate is applied to the surface of the substrate.

193. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein metering a coating of an energy curable liquid laminate to a surface of a substrate further comprises:

measuring the energy curable liquid laminate is applied to the surface of the substrate to a depth in excess of twenty thousandths of an inch (20.0 mils.).

194. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein metering a coating of an energy curable liquid laminate to a surface of a substrate further comprises:

measuring the energy curable liquid laminate is applied to the surface of the substrate to a depth in excess of twenty-five thousandths of an inch (25.0 mils.).

195. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein metering a coating of an energy curable liquid laminate to a surface of a substrate further comprises:

measuring the energy curable liquid laminate is applied to the surface of the substrate to a depth in excess of thirty thousandths of an inch (30.0 mils.).

196. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein metering a coating of an energy curable liquid laminate to a surface of a substrate further comprises:

measuring the energy curable liquid laminate is applied to the surface of the substrate to a depth in excess of thirty-five thousandths of an inch (35.0 mils.).

197. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein metering a coating of an energy curable liquid laminate to a surface of a substrate further comprises:

measuring the energy curable liquid laminate is applied to the surface of the substrate to a depth in excess of thirty-five thousandths of an inch (35.0 mils.).

198. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein prior to metering the coating of an energy curable liquid laminate to a surface of a substrate further comprises: the method further comprises:

combining silicon with the curable liquid.

199. The automated method for created high gloss laminated substrate surface recited in Claim 185 above, further comprises:

curing the substrate; and

downloading the substrate from the conveyance system.

200. The automated method for created high gloss laminated substrate surface recited in Claim 185 above, wherein conveying the substrate having the energy curable liquid laminated surface on the conveyance system in a predetermined direction, further comprises:

conveying the plurality substrate holding members in the predetermined direction for a predetermined distance.

201. The automated method for created high gloss laminated substrate surface recited in Claim 200 above, wherein the predetermined distance is based on an amount of time for the energy curable liquid laminate to pre-cure on the surface of the substrate.

202. The automated method for created high gloss laminated substrate surface recited in Claim 201 above, wherein the amount of time is based on one of thickness of the energy curable liquid laminate and the predetermined orientation of the surface of the substrate.

203. The automated method for created high gloss laminated substrate surface recited in Claim 185 further comprises:

containing residual energy curable liquid laminate flowing from the surface of the substrate.

204. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein the predetermined direction is substantially linear.

205. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein the conveyance system is substantially horizontal, conveying the plurality substrate holding members on the conveyance system in a predetermined direction further comprises:

conveying the plurality substrate holding members in a substantially horizontal direction.

206. The automated method for created high gloss laminated substrate surface recited in Claim 205, wherein the predetermined orientation is near vertical.

207. The automated method for created high gloss laminated substrate surface recited in Claim 185, wherein the conveyance system is substantially vertical, conveying the plurality substrate holding members on the conveyance system in a predetermined direction further comprises:

conveying the plurality substrate holding members in a substantially vertical direction.

208. The automated method for created high gloss laminated substrate surface recited in Claim 207, wherein the predetermined orientation is near horizontal.

209. The automated method for created high gloss laminated substrate surface recited in Claim 185 further comprises:

curing the substrate;

metering a coating of an energy curable liquid laminate to another surface of the substrate, the coating being metered to a depth of less than twelve thousandths of an inch (12.0 mils.);

transferring the other coated substrate to one of a plurality of substrate holding members, each of the plurality of substrate holding members being adjoined to a conveyance system, wherein the one of a plurality of substrate holding members is conveyed in a predetermined direction; and

conveying the other substrate having the energy curable liquid laminated surface on the conveyance system in a predetermined direction, wherein the one of a plurality of substrate holding members substrate holding member is configured for holding the liquid laminated substrate in a preset orientation, the preset orientation askew to the second predetermined direction.

210. The automated method for created high gloss laminated substrate surface recited in Claim 209 further comprises:

wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

211. The automated method for created high gloss laminated substrate surface recited in Claim 209, wherein the predetermined orientation is between ninety-one degrees (91°) and one-hundred thirty degrees (130°) to the predetermined direction.

212. The automated method for created high gloss laminated substrate surface recited in Claim 209, wherein the predetermined orientation is between one-hundred thirty degrees (130°) and one-hundred seventy-nine degrees (179°) to the predetermined direction.

213. The automated method for created high gloss laminated substrate surface recited in Claim 209, wherein applying a curable liquid to a surface of a substrate further comprises:

screening the energy curable liquid laminate is applied to the surface of the substrate.

214. The automated method for created high gloss laminated substrate surface recited in Claim 209, wherein applying a curable liquid to a surface of a substrate further comprises:

jetting the energy curable liquid laminate is applied to the surface of the substrate.

215. The automated method for created high gloss laminated substrate surface recited in Claim 209 further comprising:

curing the energy curable liquid laminate on the surface of the other substrate.

216. A laminated product formed using a sheet flow lamination process comprising coating a surface with an energy curable liquid laminate, orienting the coated surface such that the coated surface is at an angle greater than forty-five degrees (45°) from horizontal thereby flowing the energy curable liquid laminate across the surface and curing the liquid laminate, the laminated product comprising:

a substrate; and

a laminate layer formed from the energy curable liquid laminate, wherein the laminate layer has a depth in excess of twelve thousandths of an inch (12.0 mils.) and further wherein a surface of the laminate layer has a gloss level in excess of ninety-seven (97.0) gloss units measured at sixty degrees (60°).

217. The laminated product recited in Claim 216 above, wherein the energy curable liquid laminate is curable by exposure to ultraviolet energy.

218. The laminated product recited in Claim 216 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

219. The laminated product recited in Claim 216 above, wherein the substrate is a graphic media including at least one graphics image.

220. The laminated product recited in Claim 219 above, wherein the substrate is a graphic media is a printable media and the laminate layer is applied to one of the printable media, graphics image, and printable media and graphics image.

221. The laminated product recited in Claim 220 above, wherein the energy curable liquid laminate is curable by exposure to ultraviolet energy.

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222. The laminated product recited in Claim 221 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

223. The laminated product recited in Claim 221 above, wherein the energy curable liquid laminate is applied to a surface of the substrate using one of screen application, jet application and roller application.

224. The laminated product recited in Claim 216 above, wherein the laminate layer has a depth in excess of twenty thousandths of an inch (20.0 mils.).

225. The laminated product recited in Claim 216 above, wherein the laminate layer has a depth in excess of twenty-five thousandths of an inch (25.0 mils.).

226. The laminated product recited in Claim 216 above, wherein the laminate layer has a depth in excess of thirty thousandths of an inch (30.0 mils.).

227. The laminated product recited in Claim 216 above, wherein the laminate layer has a depth in excess of thirty-five thousandths of an inch (35.0 mils.).

228. The laminated product recited in Claim 216 above, wherein the surface of the laminate layer has a gloss level in excess of one hundred (100.0) gloss units measured at sixty degrees (60°).

229. The laminated product recited in Claim 216 above, wherein the surface of the laminate layer has a gloss level in excess of one hundred five (105.0) gloss units measured at sixty degrees (60°).

230. The laminated product recited in Claim 216 above, wherein the surface of the laminate layer has a gloss level in excess of one hundred ten (110.0) gloss units measured at sixty degrees (60°).

231. The laminated product recited in Claim 216 above, wherein the surface of the laminate layer has a gloss level in excess of one hundred fifteen (115.0) gloss units measured at sixty degrees (60°).

232. The laminated product recited in Claim 216 above, wherein the laminate layer further includes silicon added to the energy curable liquid laminate prior to curing the energy curable liquid laminate.

233. The laminated product recited in Claim 216 above, wherein the substrate is preprocessed with an ink-receptive coating.

234. The laminated product recited in Claim 233 above, wherein the substrate is one of cellulose-based pulp paper, cotton-based pulp paper, cardboard, matte, polyethylene (polythene), cast polypropylene, oriented polypropylene, cellophane, co-extrusions polyvinylchlorid, laminated substrates, metallised film and polyester.

235. The laminated product recited in Claim 216 above, wherein the surface of the substrate laminated using the sheet flow lamination process has a gloss level value at least five (5.0) gloss units higher than an identical substrate laminated with an identical energy curable liquid laminate not using the sheet flow lamination process.